

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Brian A. Batke

Art Unit: 2157

Serial No.: 09/967,124

Examiner: Hussein A. El Chanti

Filing Date: September 28, 2001

Customer No. 63122

Title: *Embedded Web-Accessible Industrial
Control System*

Atty. Dkt. No.: 01AB074 (1506.040)

AMENDED APPELLANT'S APPEAL BRIEF

Mail Stop – Appeal Brief - Patent
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

On or about January 26, 2007, Appellant appealed from the final rejection of claims 1-20. An amended Appellant's Appeal Brief was submitted pursuant to 37 CFR § 41.37 on July 2, 2007 to correct noncompliant elements.

The following Appellant's Appeal Brief is submitted pursuant to 37 CFR § 41.37 to correct noncompliant elements regarding the explanation of dependent claim 3 per the notice of October 3, 2007. A description of claim 3 including a mapping to the specification by page and line number has been added to the summary of claimed subject matter. Please charge any additional fees to Deposit Account No. 50-1170.

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REAL PARTY IN INTEREST

The real party in interest of the above-identified application is Rockwell Automation, Inc., a Delaware Corporation, located and doing business at 1201 South Second Street, Milwaukee, Wisconsin.

RELATED APPEALS AND INTERFERENCES

None.

STATUS OF CLAIMS

The Examiner has rejected claims 1-5, 10, 15-20 under 35 U.S.C. §103(a) as being unpatentable over a combination of three references: Papadopoulos, Lindner, and Bronikowski (6,947,798).

In addition, the Examiner has rejected claims 6-9 and 11-12 under 35 U.S.C. §103(a) as being unpatentable over a combination of four references: Papadopoulos, Lindner, Hauet, and Bronikowski.

Finally, the Examiner has rejected claim 13 under 35 U.S.C. §103(a) as being unpatentable over a combination of four references: Papadopoulos, Lindner, Chan, and Bronikowski.

All of the claims have been finally rejected, and the rejection of claims 1-20, is appealed. The claims, as they presently stand, are found in the Claims Appendix to this Appellant's Appeal Brief.

STATUS OF AMENDMENTS

A *Response After Final Office Action* was filed by Applicant in response to an Office Action dated July 27, 2006 noting that the Examiner had failed to establish a *prima facie* rejection using the Bronikowski reference and offering an additional amendment.

On November 21, 2006, the Examiner issued an *Advisory Action* confirming the final rejection of claims 1-20 without reply to the failure to establish a *prima facie* rejection and indicating the amendments would not be entered for the purpose of appeal.

The amendments offered by the Applicant on July 27, 2006 were intended to expedite the prosecution of this application but are not considered necessary to the allowability of the claims and accordingly are retracted. The Applicant relies on the claims as they existed before the Final Office Action of July 27, 2006, as listed in the Applicant's *Amendment* of April 26, 2006, and as provided below.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention concerns industrial control systems (such as programmable logic controllers or PLCs) which are special purpose computers that control industrial machinery and processes. *Specification, page 2, lines 11-22*. Industrial controllers differ from standard computers in that they are highly customizable to conform to the demands of the industrial process being controlled. *Specification page 2, lines 27-29*.

A principal form of customization of an industrial controller is the writing of a unique control program for the industrial controller. *Specification page 3, lines 1-9*. As is understood in the art, control programs are not simply entered as text but require the use of specialized "program development software" that provide a development environment. Program development software may be distinguished from the control program in that the former is run on a general purpose computer by a programmer and does not control machinery, while the latter is run on a programmable logic controller to control machinery or the like in real-time.

Program development software is complex and requires significant memory and processing power to run. *Specification page 3, lines 13-14*. The program development software may be updated from time to time, and it is important that the version of the program development software match the version of the control program. *Specification page 3, lines 15-22*.

The present invention allows an expert in a particular industrial process to easily program an industrial controller remotely. *Specification page 4, lines 2-6*. This is done by providing a web access module incorporated into industrial controller. *Specification page 4, lines 6-9*. The program development software needed for programming the industrial controller or modifying the programs on the industrial controller and the control program are held by the web access module. *Specification page 4, lines 9-13*. A remote user can then upload the program development software from the web access module to program or modify the industrial controller knowing that they have the correct and compatible version for the control program. *Specification page 4, lines 13-16*.

The advantage to this approach is that the control program and the software necessary to generate or modify the control program and the control program are held in one location. *Specification page 7, line 24-27*. Further, a programmer may have access to both from any remote terminal connected to the Internet. *Specification page 7, lines 18-21*. In this regard, the invention provides a simplified version of the program development software for remote terminals that may have limited processing or memory resources. *Specification page 8, lines 8-13*.

This centralization of the program development software and the control program executed by the industrial controller also greatly simplifies updating the program development software that may be used by many dispersed users. *Specification page 8, lines 12-17*. In addition, legacy control programs may be accommodated by retaining multiple versions of the program development software on the controller and matching those versions to the control program desired to be modified by a remote user. *Specification page 8, line 30 to page 9, line 4*.

The above description gives an overall summary of the preferred embodiments of the invention; the following summarizes the claims at issue.

Claim 1 is an independent apparatus claim that describes an industrial control system implementing the present invention. The industrial control system includes I/O modules (130, 140, 150) that exchange control signals with an industrial process and a web access module (100) which includes a programmable logic controller (165) and a Web server (160). The web access module (100) must include program development software (190) as well as at least one control program (180). The program development software must be sent (250) to a remote user (10) to allow the remote user to modify the controller program (180). *Specification page 6, lines 1-30*;

specification page 7, lines 15- 25, specification page 10, lines 1 through 9.

Claim 3 is an apparatus claim dependant on claim 1 and indicating that the programmable logic controller executes the controller program after remote user has generated the controller program using the program development software and the controller program has been returned to the web access module. *Specification page 9, lines 25-28.*

Claim 6 is an apparatus claim dependant on claim 5 and indicating that the control program and the program development software may be sent at the same time over the Internet to a remote device. *Specification page 10, lines 3-5.*

Claim 11 is an apparatus claim dependant on claim 1 indicating that the Web server provides program development software to a remote user in response to a request. *Specification page 9, line 16-20 and page 10, lines 3-5.*

Claim 12 is an apparatus claim dependant on claim 1 reciting the provision of the program development software from a linked site. *Specification page 80, lines 25-29.*

Claim 13 is an apparatus claim dependant on claim 1 and describing a system controlled by the industrial controller for linking and uploading of program development software and payment by the remote user using a credit card. *Specification page 10, lines 23 through 30.*

Claim 15 is an independent apparatus claim covering a web access module (100) implementing the present invention that may be used with an industrial control system. The industrial control system includes control devices that monitor and control an industrial process such as I/O modules (130, 140, 150) that exchange control signals with an industrial process and a web access module (100). The web access module (100) includes a processor and a memory (170) which holds programming software (190) for creating a controller program (180). The processor communicates with the memory (170) to send the programming software (190) to a remote device (10) via the Internet (20). See also, Fig. 2 and process blocks 250-260. The remote device (10) generates a controller program (180) using the programming software (190). *Specification page 6, lines 1-30; specification page 7, lines 15- 25, specification page 10, lines 1-27. Figs. 1 and 2.*

Claim 18 is an independent method claim that describes generating a controller program (180) for an industrial control system that includes control devices that monitor and control an industrial process such as I/O modules (130, 140, 150) that exchange control signals with an industrial process. The method provides a web server (160) being part of a web access module

(100) holding program development software (190) as well as at least one control program (180). The web server communicates (250) with a remote device (10) to send the program development software to the remote device (10) to allow the remote user to generate the controller program

(180) and send it back (260) to the web server (160). *Specification page 6, lines 1-30; specification page 7, lines 15-25, specification page 10, lines 1-28. Figs. 1 and 2.*

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The issues presented for review are as follows:

I. Whether claims 1-5, 10, 15-20 are unpatentable under 35 U.S.C. §103(a) in light of Papadopoulos, Lindner and Bronikowski.

II. Whether claims 6-9 and 11-12 are being unpatentable under 35 U.S.C. §103(a) in light of Papadopoulos, Lindner, Hauet, and Bronikowski.

III. Whether claim 13 is unpatentable under 35 U.S.C. §103(a) as over Papadopoulos in view of Papadopoulos, Lindner, Chan, and Bronikowski.

ARGUMENT

I. The Rejection Of Claims 1-5, 10, 15-20 Under 35 U.S.C. §103(a) In Light Of Papadopoulos, Lindner And Bronikowski.

A. The Examiner has failed to make a *prima facie* rejection of claims 1-5, 10, 15-20.

In making the above rejection, the Examiner cites language found only in the Bronikowski 6,947,798 patent which was filed October 18, 2002 more than a year after the filing date of the present invention. *Final Office Action, page 2, final paragraph, citing: col. 2, lines 2-12 and lines 44-46, col. 3, lines 60-64 and col. 7, lines 1-65.* While Bronikowski is a continuation in part on an earlier application (6,477,435), neither the language cited by the Examiner nor corresponding disclosure is found in this earlier '435 application.

As such, the language and teachings cited by the Examiner date only to a filing date of October 18, 2002, after the filing date of the present invention. This was noted in a Response After Final Rejection by the Applicant, however, the Examiner has not replied with any citation to the earlier patent 6,477,435. Accordingly, the Examiner has failed to carry his burden of making an obviousness rejection.

B. The references, even in combination, fail to teach the limitations of independent claims 1, 15, 18.

Generally, each of the independent claims requires (1) that a control program be created remotely for an Internet connected PLC and (2) that program development software be uploaded from the PLC to a remote user to aid in creating the control program. Papadopoulos teaches neither of these limitations.

The Examiner states that Papadopoulos includes a Web server including "program development software...that can be utilized to generate a control program for a least one of the PLC and one of the I/O devices". However, the citation by the Examiner (*column 4, line 37-39*) describes simply controlling the PLC from a human-machine interface (HMI), e.g., a remote terminal. The remote control of a device is not the same as the remote development of a control program for operating the device. In Papadopoulos, no control program is developed and no program development software is used.

The Examiner also suggests that Papadopoulos teaches "providing the program development software onto the Internet for transmission to a remote device so that the remote device is able to generate a control program." Again, the citation by the Examiner (*column 4, lines 34-39*) describes a remote control of a PLC from a remote HMI, for example, by providing commands to the PLC from the HMI. Providing commands to a PLC from a remote terminal is not the same uploading program development software and using that to write a control program that may be downloaded and executed by the PLC.

Linder does not remedy the failures of Papadopoulos. Linder teaches uploading a webpage to a remote browser where the webpage may include a control program to be displayed on the browser. Again, there is no teaching in Linder of (1) a control program created remotely for an Internet connected PLC or (2) program development software being uploaded from the PLC to a remote user to aid in creating the control program. At best, Linder teaches only passive viewing of a control program at a browser. There is no teaching of creating the control program at the browser or uploading program development software. Thus, even the combination of Linder and Papadopoulos does not teach critical limitations of the independent claims.

Perplexingly, despite the Examiner's assertion that Papadopoulos teaches a web access module including "program development software" (*Final Office Action, page 4, final paragraph*), the Examiner states at the final full paragraph of page 5 that "neither Papadopoulos

or Linder teach 'program development software'".

As noted above, the Bronikowski case is not prior art to the present application. Nevertheless, Bronikowski, even if it were prior art, does not remedy the deficiencies of Linder and Papadopoulos.

The Examiner asserts that Bronikowski teaches "program development software... that can be utilized to generate a control program for a least one of the PLC and one of the I/O devices" and that is provided "onto the Internet for transmission to the remote device, so that the remote device is able to generate the control program". *Final Office Action, page 3, first paragraph*. Yet the sections of Bronikowski cited by the Examiner (*column 2 lines 2-12 and 44-46, column 3 lines 60-64 and column 7 lines 1-65*) describe only collaborative programming in which programmers share files to create a control program. While this is "remote programming" of a controller, it fails to teach (1) a control program be created remotely for an internet connected PLC or (2) that program development software uploaded from the PLC to a remote user to aid in creating the control program.

A person of skill in the art would recognize that Bronikowski has all the failings of the prior art described in the present application, that is:

- (1) requiring any downloading of the remotely developed program by a proprietary communication link (and therefore, that the user have access to special networks);
- (2) requiring the remote machines to have significant memory and processing power (and therefore, that the remote user have access to dedicated programming terminals);
- (3) requiring the remote users to have special program development software on their machines that was installed by them (and therefore, that the user be on a particular machine that they have previously installed programming software on); and
- (4) creating problems with the matching of version numbers of the control programs and program development software (and therefore, requiring that the user has planned on modifying programs for the particular controller in advance and has independently obtained the proper version number of the programming software). See generally, these defects in the prior art listed in the current specification at page 3, lines 1-22.

As a result, the ability of a remote programmer to log onto any web browser and provide editing or modification of control programs of any version, anywhere in the world, is neither suggested nor enabled.

Each of claims 1, 15 and 18 have claim elements directed toward: (1) a control program being created remotely for an Internet connected PLC and (2) program development software being uploaded from the PLC to a remote user to aid in creating the control program. Accordingly, all the independent claims and thus all of the dependent claims are properly allowable over the cited references.

C. The references, even in combination, fail to teach the limitations of dependent claims 3, and independent claim 18.

Claims 3 and 18 require that the control program generated at the remote device using the program development software be then downloaded over the Internet to the controller to be executed on the controller.

The Examiner agrees that Papadopoulos fails to teach executing the control program on the controller after it has been modified by a remote device (*Final Office Action, page 6 paragraph 6*) but relies instead on Lindner at column 4, line 35 to column 5, line 6. In this respect, the Examiner misunderstands Lindner which teaches only an uploading of a webpage holding a control program for passive viewing of the control program. The control program is neither modified nor downloaded for execution on the controller and downloaded back to the controller.

II. The Rejection Of Claims 6-9 and 11-12 Under 35 U.S.C. §103(a) In Light Of Papadopoulos, Lindner, Hauet, and Bronikowski.

A. The Examiner has failed to make a *prima facie* rejection of claims 6-9 and 11-12.

As noted above, the Bronikowski reference is not prior art to the present application. Accordingly, the Examiner has failed to make at *prima facie* case for obviousness under this combination of references which requires the Bronikowski reference.

B. The references, even in combination, fail to teach the limitations of dependent claims 6, 11, and 12.

Claim 6 requires that an existing control program on the controller be uploaded together with the software necessary to modify that control program to a remote device for modification or editing. As noted above, none of the above references alone or in combination, even if Bronikowski is included, teach the limitations of claim 1 on which these claims depend, nor do

they teach uploading both the control program and the software necessary to modify that control program together.

The cited portions of Hauet (*column 4, lines 14-20 and column 3, lines 49-51*) teach a remote user providing "information" to a control system over the Internet. Applicant can find no indication that Hauet teaches uploading a control program for modification by a remote user together with software necessary to make that modification. The Examiner cites Howard for teaching modifying a control program, something the Applicant agrees is well known. What is not taught by Howard, and what is required by the claims, however, is that the control program and the program development software necessary to modify the control program may be uploaded from a Web server. Thus, Hauet fails to teach the limitation of claim 6.

Claims 11 and 12 require uploading of program development software on demand from a remote location. As noted above, this uploading is not taught by any of the references of Papadopoulos, Lindner, and Bronikowski. Hauet does not remedy this deficiency, nor does the Examiner seem to suggest otherwise.

III. The Rejection Of Claim 13 Under 35 U.S.C. §103(a) Over Papadopoulos In View Of Papadopoulos, Lindner, Chan, And Bronikowski.

A. The Examiner has failed to make a *prima facie* rejection of claim 13.

Again, this rejection relies on a combination of references including the Bronikowski reference which is not prior art to the present application. Accordingly, the Examiner has failed to make at *prima facie* case for obviousness under this combination of references which requires the Bronikowski reference.

B. The references, even in combination, fail to teach the limitations of dependent claim 13.

Claim 13 covers a feature of using the industrial controller as a commerce site allowing remote users to purchase updated software development programs needed for the control programs on their industrial controller. Chan teaches generally a "smart card" card system operable over the Internet. Applicant believes that there is insufficient teaching in the art or any of these references for the combination of the Chan system with an industrial control system used to control factories or the like.

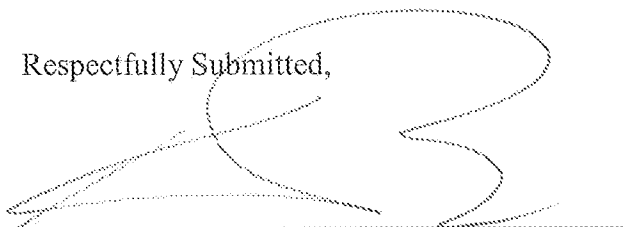
Even assuming this combination is proper, the clear teachings of these references would be simply to establish an online store for the sale of program development software using credit cards over the Internet. There is no teaching or suggestion that the source of or links to this electronic commerce could be by the industrial controller itself or any motivation (recognized in the prior art).

Accordingly, the Applicant believes that the references are not properly combinable, and if combinable, would not produce the present invention according to an understanding of the art at this time.

CONCLUSION

The combination of references relied upon does not fairly teach the limitations of claims 1, 15 and 18, nor the claims dependent on these claims by virtue of their dependency, nor specifically the limitations of claim 6, 11, 12 or claim 13. Therefore, the Applicant requests that the Board overturn the Examiner's rejection of these claims and pass all claims 1-20 to allowance.

Respectfully Submitted,

A large, stylized handwritten signature in black ink, appearing to be 'KB', is written over a horizontal line.

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CLAIMS APPENDIX

1. (previously presented) An industrial control system for controlling an industrial process comprising:
 - a plurality of I/O devices capable of exchanging signals with the industrial process;
 - a web access module including a web server coupled to a programmable logic control (PLC), wherein the web server is capable of being coupled to at least one remote device via the Internet, and wherein the PLC is coupled to the I/O devices;
 - wherein the web access module further includes program development software including application software that can be utilized to generate a controller program for at least one of the PLC and one of the I/O devices, and
 - wherein the web server is capable of providing the program development software onto the Internet for transmission to the remote device, so that the remote device is able to generate the controller program.
2. (original) The industrial control system of claim 1, wherein the PLC and the web server are one of: (a) implemented in a single computer executing two programs; and (b) implemented respectively in two different computers that are in communication via a communication link.
3. (previously presented) The industrial control system of claim 1, wherein the PLC executes the controller program, once the remote device has generated the controller program using the application software and the controller program has been returned to the web access module from the remote device.
4. (previously presented) The industrial control system of claim 1, wherein the program development software is stored within at least one of the PLC, the web server, a memory device within the web access module, a memory device within at least one of the I/O devices and a remote memory device.
5. (original) The industrial control system of claim 4, wherein an existing controller program is stored within at least one of the PLC, the web server, a memory device within the

web access module, a memory device within at least one of the I/O devices and a remote memory device.

6. (previously presented) The industrial control system of claim 5, wherein the web server is capable of sending the existing controller program along with the application software to the remote device by way of the Internet, so that the remote device is able to modify the existing controller program to generate the controller program.

7. (original) The industrial control system of claim 6, wherein it is allowable for the remote device to remotely store a backup copy of the controller program generated based upon the existing controller program.

8. (previously presented) The industrial control system of claim 6, wherein the program development software includes a plurality of versions of application software, and wherein the existing controller program and a plurality of additional existing controller programs are stored in association with the respective versions of the application software that were employed to generate the respective existing controller programs.

9. (previously presented) The industrial control system of claim 6, wherein the program development application software that is sent along with the existing controller program is of a version that was used to generate the existing controller program.

10. (original) The industrial control system of claim 1, wherein the web server is coupled to the Internet by way of an Internet interface, and wherein the PLC is coupled to the I/O devices by way of a control network interface.

11. (previously presented) The industrial control system of claim 1, wherein the web server provides the program development software to the remote device in response to a request received from the remote device.

12. (previously presented) The industrial control system of claim 1, wherein the web

server provides onto the Internet, in response to a request received from the remote device, information indicative of another Internet-accessible location at which the remote device can obtain desired program development software.

13. (previously presented) The industrial control system of claim 1 wherein, prior to the sending of the program development software to the remote device, the web access interface must receive a signal indicative of at least one of a payment agreement and a credit card number from the remote device.

14. (previously presented) The industrial control system of claim 13, wherein the signal must be received only when the program development software to be sent is a new version of the application software that has not earlier been communicated to the remote device.

15. (previously presented) In an industrial control system having a plurality of control devices that operate to monitor and control an industrial process, a web access module coupled to the plurality of control devices, the web access module comprising:

a memory means for storing program development software including application software utilized to generate a controller program for operation on at least one of the web access module and one of the control devices; and

a processor means coupled to the memory means, the processor means for sending the program development software to a remote device and receiving communications concerning the controller program from the remote device, wherein the controller program is generated at the remote device through the use of application software included with the program development software,

wherein the web access module is further adapted to allow for communications between the processor means and the remote device by way of the Internet.

16. (previously presented) The web access module of claim 15, wherein the processor means includes a web server and a PLC, and wherein an existing controller program is stored by the memory means in association with a particular version of the program development application software.

17. (original) The web access module of claim 16, wherein the control devices are selected from the group consisting of I/O modules, motor controllers, and PLCs.

18. (previously presented) A method of generating a controller program for at least one control device of an industrial control system that monitors and controls an industrial process, the method comprising:

providing a web server within the industrial control system, wherein the web server is capable of communicating with at least one remote device via the Internet;

obtaining program development software including application software capable of being used to generate the controller program;

providing the program development software onto the Internet for transmission to the at least one remote device; and

receiving from the at least one remote device the generated controller program.

19. (previously presented) The method of claim 18, further comprising: obtaining an existing controller program from a memory device on which the existing controller program is stored, the program development software being associated with the existing controller program;

providing the existing controller program onto the Internet for transmission to the at least one remote device; and

after receiving the generated controller program from the at least one remote device, storing the generated controller program on the memory device in association with a version of the application software that was utilized to generate that controller program.

20. (original) The method of claim 19, wherein the web server and a PLC are included within a web access module, wherein the PLC is coupled to a plurality of additional control devices within the industrial control system, and wherein the controller program is utilized by at least one of the PLC and one of the additional control devices.--

EVIDENCE APPENDIX

Applicant submits no evidence pursuant to 37 CFR § 1.130, 1.131 or 1.132 or any other evidence beyond the references cited in the present application.

RELATED PROCEEDINGS APPENDIX

No decision from a related proceeding has been rendered by a court or this Board.